WHAT IS CLAIMED IS:

1. A method of manufacturing a one-piece closed-shape structure using a mandrel, comprising:

preparing the mandrel, wherein the mandrel comprises a bag and an armature;

applying a frame mandrel to the mandrel to form a frame for the structure;

filling the mandrel and the frame mandrel with media;

applying a curable resign to a fiber;

applying the fiber over the mandrel and frame mandrel to form the structure;

curing the structure;

removing the media from the mandrel and frame mandrel; and

extracting the mandrel and frame mandrel from the structure.

2. The method of claim 1, wherein preparing further comprises:

placing the armature through the bag; and

conforming the shape of the bag to a desired shape of the structure.

3. The method of claim 2, wherein conforming further comprises:

sealing the bag;

placing the armature and the bag in a form tool; and

conforming the shape of the bag to the form tool.

4. The method of claim 3, wherein conforming further comprises:

filling a space between the armature and the bag with air; and

creating a vacuum between the form tool and the bag to force the bag to conform to the shape of the form tool.

5. The method of claim 1, wherein applying a frame mandrel further comprises:

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applying a frame ply to an exterior of the bag; and

applying the frame mandrel over the frame ply.

6. The method of claim 1, wherein filling further comprises compacting the media.

7. The method of claim 6, wherein compacting further comprises vibrating the mandrel and frame mandrel to aid compaction.

8. The method of claim 1, wherein applying the fiber comprises:

winding the fiber over the mandrel and frame mandrel to form the structure.

9. The method of claim 8, wherein winding further comprises:

placing a first winding aid on the bag;

winding the fiber over the first winding aid, the frame mandrel, and the mandrel to form an inner skin;

cutting the inner skin to remove the first winding aids;

placing a second winding aid on the inner skin;

winding the fiber over the second winding aid and inner skin to form an outer skin; and

cutting the outer skin to remove the second winding aids.

10. The method of claim 9, wherein placing second winding aids further comprises placing a core piece on the inner skin.

11. The method of claim 1, wherein curing further comprises:

placing a mold around an exterior of the structure;

sealing the mold;

placing the mold in a heating device; and

applying heat to the mold using the heating device.

12. The method of claim 11, wherein curing further comprises:

creating a vacuum in the mandrel; and

creating a vacuum in the frame mandrel.

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13. The method of claim 1, wherein curing further comprises:

placing a mold around an exterior of the structure;

sealing the mold;

placing the mold in an autoclave; and

applying pressure to the mold using the autoclave.

14. The method of claim 1, wherein the structure is a fuselage of an aircraft.

15. A system for manufacturing a one-piece closed-shape structure using a mandrel, comprising:

a preparing component configured to prepare the mandrel, wherein the mandrel comprises a bag and an armature;

a first applying component configured to apply a frame mandrel to the mandrel to form a frame for the structure;

a first filling component configured to fill the mandrel and the frame mandrel with media;

a second applying component configured to apply a curable resign to a fiber;

a third applying component configured to apply the fiber over the mandrel and frame mandrel to form the structure;

a curing component configured to cure the structure;

a removing component configured to remove the media from the mandrel and frame mandrel; and

an extracting component configured to extract the mandrel and frame mandrel from the structure.

16. The system of claim 15, wherein the preparing component further comprises:

a placing component configured to place the armature through the bag; and

a first conforming component configured to conform the shape of the bag to a desired shape of the structure.

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17. The system of claim 16, wherein the first conforming component further comprises:

a sealing component configured to seal the bag;

a placing component configured to place the armature and the bag in a form tool; and

a second conforming component configured to conform the shape of the bag to the form tool.

18. The system of claim 17, wherein the second conforming component further comprises:

a second filling component configured to fill a space between the armature and the bag with air; and

a creating component configured to create a vacuum between the form tool and the bag to force the bag to conform to the shape of the form tool.

19. The system of claim 15, wherein the first applying component further comprises:

a fourth applying component configured to apply a frame ply to an exterior of the bag; and

a fifth applying component configured to apply the frame mandrel over the frame ply.

20. The system of claim 15, wherein the filling component further comprises a compacting component configured to compact the media.

21. The system of claim 20, wherein the compacting component further comprises a vibrating component configured to vibrate the mandrel and frame mandrel to aid compaction.

22. The system of claim 15, wherein the third applying component further comprises:

a first winding component configured to wind the fiber over the mandrel and frame mandrel to form the structure.

23. The system of claim 22, wherein the first winding component further comprises:

a first placing component configured to place a first winding aid on the bag;

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a second winding component configured to wind the fiber over the first winding aid, the frame mandrel, and the mandrel to form an inner skin;

a first cutting component configured to cut the inner skin to remove the first winding aids;

a second placing component configured to place a second winding aid on the inner skin;

a third winding component configured to wind the fiber over the second winding aid and inner skin to form an outer skin; and

a second cutting component configured to cut the outer skin to remove the second winding aids.

24. The system of claim 23, wherein the second placing component further comprises a third placing component configured to place a core piece on the inner skin.

25. The system of claim 15, wherein the curing component further comprises:

a first placing component configured to place a mold around an exterior of the structure;

a sealing component configured to seal the mold;

a second placing component configured to place the mold in a heating device; and

a heat applying component configured to apply heat to the mold using the heating device.

26. The system of claim 25, wherein the curing component further comprises:

a first creating component configured to create a vacuum in the mandrel; and

a second creating component configured to create a vacuum in the frame mandrel.

27. The system of claim 15, wherein the curing component further comprises:

a first placing component configured to place a mold around an exterior of the structure;

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a sealing component configured to seal the mold;

a second placing component configured to place the mold in an autoclave; and

a pressure applying component configured to apply pressure to the mold using the autoclave.

28. The system of claim 15, wherein the structure is a fuselage of an aircraft.

29. A computer-implemented method of manufacturing a one-piece closed-shape structure using a mandrel, comprising:

preparing the mandrel, wherein the mandrel comprises a bag and an armature;

applying a frame mandrel to the mandrel to form a frame for the structure;

filling the mandrel and the frame mandrel with media;

applying a curable resign to a fiber;

applying the fiber over the mandrel and frame mandrel to form the structure;

curing the structure;

removing the media from the mandrel and frame mandrel; and

extracting the mandrel and frame mandrel from the structure.

30. A system for manufacturing a one-piece closed-shape structure using a mandrel, comprising:

a preparing means for preparing the mandrel, wherein the mandrel comprises a bag and an armature;

an applying means for applying a frame mandrel to the mandrel to form a frame for the structure;

a filling means for filling the mandrel and the frame mandrel with media;

a first applying means for applying a curable resign to a fiber;

a second applying means for applying the fiber over the mandrel and frame mandrel to form the structure;

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a curing means for curing the structure;

a removing means for removing the media from the mandrel and frame mandrel; and

an extracting means for extracting the mandrel and frame mandrel from the structure.

31. A method of manufacturing a one-piece closed-shape structure, using a mandrel comprising:

preparing the mandrel, wherein the mandrel comprises a bag and an armature;

placing the armature through the bag;

conforming the shape of the bag to a desired shape of the structure;

applying a frame mandrel to the mandrel to form a frame of the structure;

filling the mandrel and the frame mandrel with media;

applying a curable resign to a fiber;

applying the fiber over the frame mandrel and the bag to form an inner skin;

placing a core piece on the inner skin;

applying the fiber over the core piece and inner skin to form an outer skin;

placing a mold around an exterior of the structure;

curing the structure in the mold;

removing the mold from the structure;

removing the media from the mandrel and the mandrel frame;

extracting the armature from the bag; and

extracting the bag from the structure.

32. The method of claim 31, wherein conforming further comprises:

sealing the bag;

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placing the armature and the bag in a form tool; and

conforming the shape of the bag to the form tool.

33. The method of claim 32, wherein conforming further comprises:

filling a space between the armature and the bag with air; and

creating a vacuum between the form tool and the bag to force the bag to conform to the shape of the form tool.

34. The method of claim 31, wherein applying a frame mandrel further comprises:

applying a frame ply to an exterior of the bag; and

applying a frame mandrel over the frame ply.

35. The method of claim 31, wherein filling further comprises compacting the media.

36. The method of claim 35, wherein compacting further comprises vibrating the mandrel and frame mandrel to aid compaction.

37. The method of claim 31, wherein applying the fiber over the frame mandrel and the bag to form an inner skin comprises:

winding the fiber over the frame mandrel and the bag to form the inner skin.

38. The method of claim 37, wherein winding further comprises:

placing a winding aid on the bag;

winding the fiber over the frame mandrels, the winding aid, and the bag to form the inner skin; and

cutting the inner skin to remove the winding aid.

39. The method of claim 31, wherein applying the fiber over the core piece and inner skin to form an outer skin comprises:

winding the fiber over the core piece and inner skin to form the outer skin.

40. The method of claim 39, wherein winding further comprises:

placing a winding aid on the inner skin;

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winding the fiber over the core piece, the winding aid, and the inner skin to form an outer skin; and

cutting the outer skin to remove the winding aid.

41. The method of claim 31, wherein curing further comprises:

sealing the mold;

placing the mold in a heating device; and

applying heat to the mold using the heating device.

42. The method of claim 41, wherein curing further comprises:

creating a vacuum in the mandrel; and

creating a vacuum in the frame mandrel.

43. The method of claim 31, wherein curing further comprises:

sealing the mold;

placing the mold in an autoclave; and

applying pressure to the mold using the autoclave.

44. The method of claim 31, wherein the one-piece closed-shape structure is an airplane fuselage.

45. A system for manufacturing a one-piece closed-shape structure, using a mandrel comprising:

a preparing component configured to prepare the mandrel, wherein the mandrel comprises a bag and an armature;

a first placing component configured to place the armature through the bag;

a first conforming component configured to conform the shape of the bag to a desired shape of the structure;

a first applying component configured to apply a frame mandrel to the mandrel to form a frame of the structure;

a first filling component configured to fill the mandrel and the frame mandrel with media;

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a second applying component configured to apply a curable resign to a fiber;

a third applying component configured to apply the fiber over the frame mandrel and the bag to form an inner skin;

a second placing component configured to place a core piece on the inner skin;

a fourth applying component configured to apply the fiber over the core piece and inner skin to form an outer skin;

a third placing component configured to place a mold around an exterior of the structure;

a curing component configured to cure the structure in the mold;

a first removing component configured to remove the mold from the structure;

a second removing component configured to remove the media from the mandrel and the mandrel frame;

a first extracting component configured to extract the armature from the bag; and

a second extracting component configured to extract the bag from the structure.

46. The system of claim 45, wherein the first conforming component further comprises:

a sealing component configured to seal the bag;

a fourth placing component configured to place the armature and the bag in a form tool; and

a second conforming component configured to conform the shape of the bag to the form tool.

47. The system of claim 46, wherein the second conforming component further comprises:

a second filling component configured to fill a space between the armature and the bag with air; and

a creating component configured to create a vacuum between the form tool and the bag to force the bag to conform to the shape of the form tool.

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48. The system of claim 45, wherein the first applying component further comprises:

a fifth applying component configured to apply a frame ply to an exterior of the bag; and

a sixth applying component configured to apply a frame mandrel over the frame ply.

49. The system of claim 45, wherein the first filling component further comprises a compacting component configured to compact the media.

50. The system of claim 49, wherein the compacting component further comprises a vibrating component configured to vibrate the mandrel and frame mandrel to aid compaction.

51. The system of claim 45, wherein the third applying component comprises:

a first winding component configured to wind the fiber over the frame mandrel and the bag to form the inner skin.

52. The system of claim 51, wherein the first winding component further comprises:

a fourth placing component configured to place a winding aid on the bag;

a second winding component configured to wind the fiber over the frame mandrels, the winding aid, and the bag to form the inner skin; and

a cutting component configured to cut the inner skin to remove the winding aid.

53. The system of claim 45, wherein the fourth applying component comprises:

a first winding component configured to wind the fiber over the core piece and inner skin to form the outer skin.

54. The system of claim 53, wherein the first winding component further comprises:

a fourth placing component configured to place a winding aid on the inner skin;

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a second winding component configured to wind the fiber over the core piece, the winding aid, and the inner skin to form an outer skin; and

a cutting component configured to cut the outer skin to remove the winding aid.

55. The system of claim 45, wherein the curing component further comprises:

a sealing component configured to seal the mold;

a fourth placing component configured to place the mold in a heating device; and

a heat applying component configured to apply heat to the mold using the heating device.

56. The system of claim 55, wherein the curing component further comprises:

a first creating component configured to create a vacuum in the mandrel; and

a second creating component configured to create a vacuum in the frame mandrel.

57. The system of claim 45, wherein the curing component further comprises:

a sealing component configured to seal the mold;

a fourth placing component configured to place the mold in an autoclave; and

a pressure applying component configured to apply pressure to the mold using the autoclave.

58. The system of claim 45, wherein the one-piece closed-shape structure is an airplane fuselage.

59. A computer-implemented method of manufacturing a one-piece closed-shape structure, using a mandrel comprising:

preparing the mandrel, wherein the mandrel comprises a bag and an armature;

placing the armature through the bag;

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conforming the shape of the bag to a desired shape of the structure;

applying a frame mandrel to the mandrel to form a frame of the structure;

filling the mandrel and the frame mandrel with media;

applying a curable resign to a fiber;

applying the fiber over the frame mandrel and the bag to form an inner skin;

placing a core piece on the inner skin;

applying the fiber over the core piece and inner skin to form an outer skin;

placing a mold around an exterior of the structure;

curing the structure in the mold;

removing the mold from the structure;

removing the media from the mandrel and the mandrel frame;

extracting the armature from the bag; and

extracting the bag from the structure.

60. A system for manufacturing a one-piece closed-shape structure, using a mandrel comprising:

a preparing means for preparing the mandrel, wherein the mandrel comprises a bag and an armature;

a first placing means for placing the armature through the bag;

a conforming means for conforming the shape of the bag to a desired shape of the structure;

a first applying means for applying a frame mandrel to the mandrel to form a frame of the structure;

a filling means for filling the mandrel and the frame mandrel with media;

a second applying means for applying a curable resign to a fiber;

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a third applying means for applying the fiber over the frame mandrel and the bag to form an inner skin;

a second placing means for placing a core piece on the inner skin;

a fourth applying means for applying the fiber over the core piece and inner skin to form an outer skin;

a third placing means for placing a mold around an exterior of the structure;

a curing means for curing the structure in the mold;

a first removing means for removing the mold from the structure;

a second removing means for removing the media from the mandrel and the mandrel frame;

a first extracting means for extracting the armature from the bag; and

a second extracting means for extracting the bag from the structure.

61. A one-piece closed shape structure, comprising:

an outer shell formed of a composite material; and

a frame formed on an interior portion of the outer shell, the outer shell and frame being co-cured to form the one-piece closed shape structure.

62. The one-piece closed shape structure of claim 61, wherein the outer shell comprises an inner and outer skin.

63. The one-piece closed shape structure of claim 62, wherein a core material is located between the inner and outer skin.

64. A one-piece closed shape structure, comprising

an outer skin formed of a composite material;

an inner skin formed of a composite material;

a frame located on an interior portion of the inner skin; and

a core material located between the inner and outer skin, wherein the outer skin, inner skin, frame, and core material have been co-cured to form the one-piece closed shape structure.

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65. A one-piece airplane fuselage, comprising

an outer skin formed of a composite material;

an inner skin formed of a composite material;

a frame located on an interior portion of the inner skin; and

a core material located between the inner and outer skin;

wherein the outer skin, inner skin, frame, and core material have been co-cured to form the one-piece airplane fuselage.

66. The airplane fuselage of claim 65, further comprising at least one integrally formed flange that has been co-cured with the outer skin, inner skin, frame, and core material.

67. The airplane fuselage of claim 66, further comprising at least one integrally formed wing attachment pocket that has been co-cured with the outer skin, inner skin, frame, core material, and flange.

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